CAVE BIOLOGY

Ivan Horáček	*horacek@natur.cuni.cz*
Petr Benda	*petr.benda@nm.cz*
Riyad Sadek	*rsadek@aub.edu.lb*
Sami Karkabi	*kraks@cyberia.net.lb*
Mounir Abi-Said	*mabisaid@cyberia.net.lb*
Radekk Lučan	*rlucan@centrum.cz*
Marcel Uhrin	*marcel.uhrin@gmail.com*
Issam Bou Jaoude	*iboujaoude@gmail.com*
Rena Karanouh	*renakaranouh@hotmail.com*
Samir Akil	*samir.akil@gmail.com*

يعد وضع تصور لعمليات مسح الخفافيش ومراقبتها دوريا من قبل (2007 هوراتشك) ، قام واضعي هذه الدراسة بعملية مسح للخفافيش سنة 2008 و 2009 في 22 مغارة داخل لبنان. نتائج المسح جائة مشرفة لارقام واعداد الخفافيش لتبين اهمية هذا المسح.

Cet article montre les résultats de la 2ème et 3ème saison de recensement des chauves-souris dans les grottes libanaises, dans le cadre du projet de surveillance proposé par Horáček et al. en 2007. Les auteurs nous propose d'observer 22 grottes libanaises entre Janvier 2008 et 2009.

BAT CENSUS IN LEBANESE CAVES 2008 & 2009

Following the article published in the Ouat'Oaute Magazine issue 14 and in frame of the monitoring project of bat population in Lebanese caves proposed by Horáček et al. ('2008) a bat survey was conducted in almost 21 different caves in the year 2008 and 17 caves in the year 2009 mostly in the same way conducted in 2007. The two seasons revealed startling new discoveries. A simple key for visual bat identification is highlighted at the end of the article to aid cavers in continuous monitoring such a delicate species.

RESULTS OF THE 2ND SEASON

From 16 January to 25 January 2008 controls in 21 Lebanese caves, mostly those inspected in the same way also in January 2007. The results of the census (surveyed in Table 1) revealed the following picture:

(1) We found no essential differences from the previous winter (2007) in species composition, proportion of particular species and abundances in particular caves and in general. This suggests a recurrent pattern of inhabitation of the respective underground spaces by bats in winter and, hence, a promise of a reliable output of the monitoring project.

(2) The large hibernating colonies found in 2007 appeared either at the same place (*Miniopterus schreibersii* in Er Rouiss) or in different chambers of the same cave (*Rhinolophus ferrumequinum* in Afqa), in both the caves the total numbers were even higher than in 2007. In Afqa, the colony was splitted in four clusters (39, 33, 10, 9 ind.) and number of solitary individuals mostly roosting closer to entrace than in 2007. The similar pattern was observed also in other sites and also an incidence of active or semi-active bats was higher than in 2007.

(3) Apparently, the winter 2008 has been undoubtedly warmer than that in 2007, snow cover was much less pronounced at time of census, temperature in low altitude caves was higher etc. In contrast to 2007, oranges were fully ripe and the fruit bats started already to feed on them. In all colonies of that species, the average body condition of fruit bats was excellent - great contrast to situation in 2007 when these bats show obvious signs of starvation. In three of four colonies controlled in winter 2007 we found a significant increase of abundance (by about 20% on avergage).

(4) In fissures at entrances of two caves (Achou, Afqa) we found hibernating individuals of *Pipistrellus pipistrellus* and *Myotis capaccinnii*, not found there in 2007, which also can be ascribed to specific climatic conditions of 2008.

RESULTS OF THE 3ND SEASON

From 14 December to 25 February 2009 controls in 12 Lebanese caves, mostly those inspected in the same way also in January 2007. The results of the census (surveyed in Table 2) revealed the following interesting observation:

(1)There is a noticeable increase in number of bats in large hibernating colonies. In the Roueiss cave roost which was found in the same place as the year 2008 a noticeable 4% increase was observed.

(2) Two major new colonies were also found. One in Marjaba mines a roost of 700 Greater Horseshoe bat, *R. ferrumequinum* was discovered in the galleries of a newly discovered Marjaba mine (not controlled in previous years), and a colony of 69 bats of *Miniopterus schreibersii* was found in the Achou cave.

(3) Apparently the winter of 2009 is a bit colder and came earlier than the previous year that is most probably why the bats were found in large quantities. The snow covered most of the mountains.

(4) In fissures at entrances of two caves (Afqa, Roueiss & Marjaba) we found hibernating individuals of *Myotis capaccinnii* and *Eptesieus serotinos* not found there in 2008.

(5) The next years of the census are expected to answer which of the above mentioned differences may refer to some general trends.

BAT SURVEY OF 2008				BAT SPECIES										
Locality			Date	Raeg	Rfer	Rhip	Rbla	Mcap	Mbly	Msch	Ppip	Eser	Hsav	Phyp
L20	M. Lebanon	Rouiss Cave	17-Jan-08		16	2				1250				
L59	M. Lebanon	Seraaya Cave	21-Jan-08		5	3								
L48	M. Lebanon	Bechara Cave	21-Jan-08											
L57	M. Lebanon	Terrash cave=Qana Cave	20-Jan-08		7	2								
L21	M. Lebanon	Afqa Cave	17-Jan-08		99	12		2			5	1	?	
L69	M. Lebanon	Aabadi cave	22-Jan-08	200										
L50	M. Lebanon	Nabaa el Saqia cave	20-Jan-08						7					
L-54	Tripoli	Achou Cave	18-Jan-08		1	4	1	3			7			
L51	Tripoli	Matal el Azrak	18-Jan-08	300	5		1							
L-25	Chekka	Musailha Castle	18-Jan-08							1				
L-25b	Chekka	Gallery near Musailha Castle	18-Jan-08				1							
L-18	Aamchit	Saleh Cave	22-Jan-08	150	4		3							
L-37	Antelias	Kanaan Cave	25-Jan-08	100										
L-32	Antelias	El-Kassarat Cave	25-Jan-08	400										
L-31	Marjaba	Marjaba Mines/7 galleries	21-Jan-08		4	7			1					
L-15	Jezzine	Water spring Gallery	24-Jan-08											
L-14	Jezzine	Cellar in a house	24-Jan-08			1								
L-64	South	Mgharet el Ouataouit	19-Jan-08	850										
L65	South	Mgharet el Aaonamine	19-Jan-08	20		1								
L-10b		Adloun cave	16-Jan-08	26										
L-41	Anjar Bekaa	Anjar Cellis Cave	21-Jan-08											
L-42	Bekaa	Kfar Zabad Cave	21-Jan-08		1		17							

Table 1
Results of 2008 winter bat census of the Lebanese caves

BAT SURVEY OF 2009				BAT SPECIES										
Locality			Date	Raeg	Rfer	Reur	Rhip	Rbla	Mcap	Mbly	Msch	Nnoc	Eser	Phyp
L20	M. Lebanon	Rouiss Cave	11 Feb. 2009		2		4		1		1300			
L59	M. Lebanon	Seraaya Cave	11 Feb. 2009		6		4				17			
L48	M. Lebanon	Bechara Cave	11 Feb. 2009											
L57	M. Lebanon	Terrash cave=Qana Cave	11 Feb. 2009											
L70	M. Lebanon	Nabaa el Mghara Cave	14 Dec. 2008		8		4							
L21	M. Lebanon	Afqa Cave	11 Feb. 2009		28		4							1
L-54	Tripoli	Achou Cave	18 Feb. 2009		2		1	2			13			
L51	Tripoli	Matal el Azrak	18 Feb. 2009	300										
L-25	Chekka	Musailha Castle	1 Feb. 2009											
L-25	Chekka	Gallery near Musailha Castle	16 Mar. 2009		1		2							
L-18	Aamchit	Saleh Cave	8 Feb. 2009	150	10		2				69			
L-37	Antelias	Kanaan Cave	23 Feb. 2009	100										
L-32	Antelias	El-Kassarat Cave	23 Feb. 2009	400										
L-31	Marjaba	Marjaba Mines/8 galleries	24 Feb. 2009		700		3			1				
L-15	Jezzine	Water spring Gallery	25 Feb. 2009											
L-14	Jezzine	Cellar in a house	26 Feb. 2009		1		4							
L-64	South	Mgharet el Ouataouit	2 Feb. 2009	820										
L65	South	Mgharet el Aaonamine	2 Feb. 2009	20			1							

Table 2
Results of 2009 winter bat census of the Lebanese caves

A SIMPLE KEY FOR VISUAL IDENTIFICATION OF LEBANESE CAVE BATS

1}
Bats of very big size, usually in a larger colony, active in winter, with large eyes shining when illuminated by hand reflectors:

EGYPTIAN FRUIT BAT
ROUSETTUS AEGYPTIACUS

***Rousettus aegyptiacus* in Mtal al Azrak cave**
(photo by Issam Bou Jaoude)

2}
Medium to large sized bats (8–12 cm of head and body length) freely sitting on walls, conspicuous by their long (as long as a body) tail freely extending from short membrane:

MOUSE-TAILED BATS
GENUS RHINOPOMA
Apparently quite rare: it is highly recommended to catch an individual, take measurements (forearm length 45–62 mm: R. cystops, 61–72 mm R. microphyllum) and a detailed picture or a voucher specimen.

A mouse-tailed bat
(photo by I. Horáček)

3}
Bats freely hanging from a ceiling or at walls, when torpid usually wrapped in membranes, when active they are conspicuous for intensive location movements of head, soon fly away, at shorter distance you can note large membranous leaflet around nose through which they emit their echolocation calls:

HORSESHOE BATS
GENUS RHINOLOPHUS
All are typical cave-dwelling species.
By visual identification you can easily distinguish three size categories:

-A larger species (10 cm when hanging):
Greater Horseshoe bat, *R. ferrumequinum.*

-A small species (about 5 cm when hanging):
Lesser Horseshoe bat, *R. hipposideros.*

-Medium-sized species (about 8–10 cm when hanging).
This is a bit more complicated category as there are several species which come in account in that category, all - in contrast to the preceeding two which are widespread) relatively rare or even not yet found in Lebanon. It can be recommended to catch one, take a measurement (length of forearm) and examine shape of noseleaf and take its macrophotograph, eventually. ***Rhinolophus euryale, R. mehelyi*** *and* ***R. blasii*** *are characteristic by a pointed central leaf (visible from a side view). The other possible species,* ***Asellia tridens****, not known from Lebanon, is pale or rufous coloured and has a noseleaf of a completely different shape.*

Photograph of the Mediterranean horse shoe bat found inside an old house in Jezzine.
(Photo by Rene Karanouh)

4}
Large bats (forearm length 75–95 mm, body length ca. 15cm), roosting in fissures, elongated head with short and mutually separated auricles and naked belly:

NAKED-BELIED TOMB BAT
TAPHOZOUS NUDIVENTRIS
Not known from Lebanon as yet, voucher specimen or a detailed photograph obligatory.

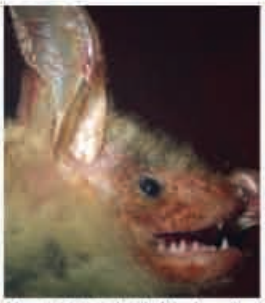
5}
Smaller (body length ca. 7–8 cm), pale greyish brown coloured bats, often in large colonies hanging in cave ceiling, typically in spacious chambers deep inside the cave, short but broad auricles not extending dorsal profile of a rounded head:

SCHREIBER'S BAT
MINIOPTERUS SCHREIBERSII
***Schreiber's bat. Miniopterus schreibersii** almost strict cave-dweller which colonies should be monitored with particular attention.*


Several small clusters of Shreiber's Bat found in Saleh mines.
(Photo by Issam Bou Jaoude)

6}
Larger bats (length of body ca. 10–12 cm) with long elongated and pale coloured membranous auricles, either hanging from walls or roosting in crevices, forming summer large colonies in high chambers inside the cave:

LARGER & LESSER MOUSE-EARED BATS
MYOTIS MYOTIS and M. BLYTHII
Sibling species, both cave-dwellers, which can be separated essentially only with genetical techniques, the former is larger and has a more eliptic and broader auricle.


Myotis blythii, **detail of the face, Baalbek**
(photo by I. Horáček)

7}
The remaining species which do not correspond to any of the above mentioned characteristics, are not the typical cave-dwellers, occupy preferably crevices in rocks, in shallow caves or in cave entrances. In most instances these are rare species which identification is not easy as a rule and should be supplemented with a detailed examination of an individual in hand. This holds true also for the two species which preferably roost in caves.

GEOFFROY'S BAT
MYOTIS EMARGINATUS AND
LONG-FINGERED BAT, M. CAPACCINII
They both remind the large species of the genus (see above) but are distinctly smaller (length of body ca. 5–7 cm).


A long-fingered bat
(photo by I. Horáček)

For more detailed information:

Dietz C., 2005. Illustrated identification key to the bats of Egypt. Version 1.0. 36 pp. e-publication. pdf: http://www.uni-tuebingen.de/uni/bzt/Kontakt/mitarbeiter_seiten/dietz.htm.

Dietz C. & Helversen O.V., 2004. Illustrated identification key to the bats of Europe, e-publication. http://public.carnet.hr/speleo/znanost/sismisi/Dietz_von_Helversen_2004IDkey_2.pdf

Horáček I., Benda P., Sadek R., Karkabi S., Abi-said M., Lucan R., Hulva P., and Karanouh R. 2008. Bats of Lebanon, State of knowledge and Perspective, *Al-Ouat 'Oaute*, 14, 52-67.